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Memo

date: October 15, 2004

to: X. Wang

from: J. Levesque *jl*

subject: DUV- FEL Fire Hazards Analysis – Addendum (Formerly SDL, Bldg. 729)

**Note: this memo is an addendum to: “Fire Protection Assessment / Fire Hazards Analysis,
Brookhaven National Laboratory, Building 729, NSLS Source Development Laboratory”, dated April 23, 1997.**

A request was made in the project to review and update the Fire Hazards Analysis contained in the Safety Assessment documents for the DUV-FEL facility, Building 729. The review was conducted over several months and included walk through inspections, interviews of facility personnel, and review of documents. In summary, the Fire Hazards Analysis has not changed significantly. A new combustible shielding was introduced, but does not change the fire loss potentials as stated in the original Fire Hazards Analysis.

The following provides some details on the issues:

To improve the radiation shielding of beam line components, a polyethylene based material containing 5% boron was installed in various areas. King Plastic Corporation manufactured this basic material for the poly-boron shielding. ThermoReax did the manufacturing of the sheets to the project's specifications under Purchase Order 44000. There was no specific fire test available to assist in the evaluation of the hazard of the 5% Boron polyethylene. The DOE fire protection community was contacted to determine if similar materials were evaluated. Only information on the 30% boron polyethylene was available. As a result, a conservative assumption has to be that the 5% polyethylene is as combustible as the pure polyethylene.

Polyethylene is a high density plastic. It will burn when exposed to radiant heat flux in excess of 20 kW per square meter. The rate at which it will burn is not excessively high. It will not produce a flash fire. It will produce heavy black smoke, as do most plastics. A burning fire will be detected by the conventional smoke detection system installed at the facility. Smoke damage will occur throughout the large expanse of the accelerator building. The ceiling mounted fire sprinkler system will contain and extinguish the fire. The original fire hazard analysis estimated damage in the realm of \$250k. This remains unchanged.

There are no recommendations based on the installation of the polyethylene shielding.

JL/lr

cc: N. Gmur
R. Travis

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